

# EHS Laboratory Guidance

## Chemical Spill Clean-up Procedures

### Introduction/Purpose

Laboratory personnel can clean up small spills if trained and equipped to do so. Small spills include chemical spills that are up to 1 liter liquids or 0.5 kilograms solids and of limited toxicity and reactivity. Small spills of metallic mercury from broken thermometers (about 1.5 grams) can be cleaned up by laboratory personnel. If respiratory protection is needed for a spill clean-up, the spill is too large to be handled by laboratory personnel – dial 911 or call EHS at (208) 885-6524 during normal business hours. Table 1 provides some examples of chemicals that should not be cleaned up by laboratory personnel until the situation is assessed by Environmental Health & Safety (EHS).

**Table 1: Chemicals that should not be cleaned up by laboratory personnel**

Chemical Class	Example
Strong Acids – Any acid that is concentrated enough to fume or emit acid gases, or presents severe health/physical hazards	Concentrated Hydrochloric Acid Fuming Sulfuric Acid Red Nitric Acid Hydrofluoric Acid Perchloric Acid
Strong Bases – Any base that is concentrated enough to emit vapors	Ammonium Hydroxide
Poison by Inhalation – Any chemical that readily emits vapors/gases at normal temperature and pressure that are extremely toxic by inhalation	Phosphorous Oxychloride Titanium Tetrachloride Chloroformates Isocyanates
Reactive – Any chemical that is reactive to air, water, shock, friction and/or temperature	Dry Picric Acid Lithium Aluminum Hydride Sodium Borohydride Phosphorous Metal Organic Peroxides
Mercury – except a small quantity, e.g. from a broken thermometer	Metallic Mercury Mercury Salts Organomercury Compounds Aqueous Mercury Solutions
Extremely Toxic/Known Carcinogen – Any chemical that is readily absorbed through the skin and is extremely toxic at small concentrations (e.g. LD <sub>50/30</sub> < 50 mg/kg)	Benzene bis-Chloromethyl Ether Phenol Sodium Cyanide

## General Spill Clean-up Procedures

1. Alert others in the laboratory or work area.
2. If the spill presents a severe health or safety risk, activate the building fire alarm at the nearest pull station, and evacuate the building.
3. Decide if you are trained, knowledgeable and equipped to handle the incident. If not, request assistance from others who are trained or call 911.
4. Never proceed to clean up a spill if you do not know the hazards associated with the chemical.
5. If anyone is injured or contaminated, call 911 and begin decontamination measures or first aid, if trained and safe to do so.
6. Barricade the spill area to prevent people from walking through it.
7. Obtain a Chemical Spill Kit or gather the supplies you will need. See Chemical Spill Kit inventory below.
8. Refer to a Safety Data Sheet (SDS) for the spilled material.
9. Don the personal protective equipment from the spill kit. At a minimum, you should wear splash goggles, nitrile gloves, a lab coat and disposable booties or disposable chemical-resistant overalls with integral booties.
10. If broken glass is involved, use the scoop from the spill kit and place the broken pieces in a plastic bag. Then place the bag in a strong tight container such as a 5-gallon plastic pail.
11. All tools used in the clean-up need to be decontaminated. Remove gross contamination with a wet paper towel and collect for proper waste disposal. Wash the tools with soap and water. Dry the tools and return to the spill kit.
12. Decontaminate goggles in the same manner as with tools. Dry and return to the spill kit.
13. Dispose of gloves and chemical-resistant overalls as waste.
14. Restock supplies in the Chemical Spill Kit.

## Specific Procedures – Flammable Liquid Spills

1. Control all sources of ignition such as flames, hot surfaces, sparking.
2. Use the 4' absorbent sock to protect floor drains.
3. Absorb the spill with the gray "Universal" spill pads. Paper towels, sponges, kitty litter or "Floor-Dry" may also be used. Place used absorbents in a plastic bag, preferably using tongs or other device to minimize direct contact.
4. Wipe the area down with a wet paper towel. Dispose in the plastic bag. Dispose gloves and overalls in the plastic bag.
5. Double-bag, then seal the plastic bags with tape. Attach a completed Chemical Waste label.
6. Submit a Chemical Waste Collection Request to EHS via the online system.

## Specific Procedures – Liquid Spill Other Than Flammable Liquids

1. A spill of a weak or dilute inorganic acid or base can be neutralized first to a pH of 5 to 9 using a neutralizing agent such as **Sodium bicarbonate, Sodium bisulfate, or Citric acid**. Gradually sprinkle the neutralizing agent on the spill. Check with pH paper.

2. Absorb the spill with the yellow “Aggressive” spill pads or other suitable absorbent.
3. Use the plastic scoop from the spill kit if solids are present.
4. Place used absorbents in a plastic bag, preferably using tongs or other device to minimize direct contact.
5. Wipe the area down with a wet paper towel. Dispose in the plastic bag. Dispose gloves and overalls in the plastic bag.
6. Double-bag, then seal the plastic bags with tape. Attach a completed Chemical Waste label.
7. Submit a Chemical Waste Collection Request to EHS via the online system.

### **Specific Procedures – Solid Spills**

1. Use the plastic scoop, scrapers and brush to collect the material. Place spilled material in a plastic bag.
2. Care should be taken to avoid creating dust or causing the spilled material to become airborne.
3. After the bulk of the material is cleaned up, wet a yellow spill pad with water and wipe the area down. Place the pads in the plastic bag.
4. Wipe the area down with a wet paper towel. Dispose in the plastic bag. Dispose gloves and overalls in the plastic bag.
5. Double-bag, then seal the plastic bags with tape. Attach a completed Chemical Waste label.
6. Submit a Chemical Waste Collection Request to EHS via the online system.

### **Specific Procedures – Broken Thermometer Clean Up**

1. Clean up the spill immediately after it has occurred.
2. Be sure to wear shoe covers or place plastic bags over your shoes during the clean-up.
3. Carefully pick up the broken thermometer pieces and place in a plastic bag.
4. Push the mercury droplets together into a bead using an index card, small scraper, or rubber squeegee.
5. Aspirate the beaded mercury into a disposable syringe, or use a disposable Pasteur pipette attached with tubing to a vacuum flask to aspirate mercury into the flask. The flask should contain a small amount of water.
6. Chemically inactivate the residual mercury by:
  - a. Using a commercial inactivating powder or sponge (e.g. “Hg Absorb”). Be sure to follow its directions for use. Dispose in a plastic bag.
  - b. Sprinkling zinc powder over the spill area. Then moisten the zinc with a 5-10% sulfuric acid solution until a paste is formed. Scour the contaminated surface and allow the paste to dry. Gently sweep up the dried paste with the brush and scoop. **CAUTION:** H<sub>2</sub>S gas will be emitted!
7. Thoroughly wash the area with a detergent solution. Dispose sponges/paper towels in the plastic bag.
8. Dispose the collected mercury, inactivating material, gloves, booties and overalls in the plastic bag. If you used a flask to aspirate the mercury droplets, stopper the flask and submit separately from the bag.

9. Double-bag, then seal the plastic bags with tape. Attach a completed Chemical Waste label.
10. Submit a Chemical Waste Collection Request to EHS via the online system.

### **Chemical Spill Kit**

Every laboratory should have a chemical spill kit readily available and stocked with supplies that are appropriate for the types of chemicals that are used. The **Chemical Spill Kit** is a five-gallon pail consisting of the following supplies:

- 1 – 5-gallon plastic pail with lid, labeled “CHEMICAL SPILL KIT”
- 10 – Universal Chemical Absorbent Pads, 20"W x 15"L (Vapor Suppressive)
- 10 – “Aggressive” Chemical Absorbent pads, 15"W x 10"L for acid and caustic spills
- 1 – 4 ft Universal Chemical Absorbent Sock, 2-3" inch diameter
- 1 each 1-qt plastic scoop
- 1 each foxtail brush
- Plastic scrapers or putty knife
- 10 - 4mm polyethylene plastic bags
- 1 roll duct tape
- 2 – pair of Nitrile gloves (North LA115EB or equivalent)
- 1 – pair of splash goggles
- 1 – pair disposable plastic-coated Tyvek or similar coveralls
- 2 – pair disposable booties
- “Hazardous Waste” labels
- 1 each “Chemical Spill Clean-Up Procedures”

Supplemental supplies (optional depending on chemicals present in the work area):

- 2 – pair Silver Shield gloves (Note: to improve dexterity, don disposable Nitrile gloves over the Silver Shield gloves)
- 1 – 1 lb box of Baking Soda to neutralize acid spills
- Mercury spill kit, including:
  - Hg Absorb powder
  - Hg Absorb sponges
  - Small plastic suction bottle (500 mL)
  - Flashlight
- Hydrofluoric acid (dilute solutions only)
  - 1 lb Calcium carbonate
  - 1 tube Calcium gluconate gel for skin exposure first aid

You can either assemble your own spill kit or purchase one from a supplier, such as Fisher Scientific or Lab Safety Supply. Everyone working in the lab should know where the spill kit is located and how to use it properly.

For any questions about assembling a hazardous material/waste spill kit or questions about spills, please contact EHS at (208) 885-6524.